

WHAT IS CLAIMED IS:

1. An adult human liver flavin-containing monooxygenase (form 3) in substantially pure form.
2. The flavin-containing monooxygenase of Claim 1, wherein the amino acid sequence is encoded for a DNA sequence set out in SEQ ID NO. 6 and allelic variants of the flavin-containing monooxygenase.
3. An isolated DNA sequence encoding an adult human liver flavin-containing monooxygenase (form 3).
4. The DNA sequence of Claim 3, wherein the DNA sequence is set out in SEQ ID NO: 6 and fragments and derivatives of the DNA sequence.
5. A procaryotic or eucaryotic host cell transformed or transfected containing DNA sequences according to Claim 4 with a heterologous regulatory control sequence in an expression vector therefor.
6. A method for in vitro screening of a compound for biological or pharmacological activity, comprising the steps of:
 - incubating a monooxygenase of claim 1 with the compound; and
 - detecting the amount of oxygen consumed as an indication of biological or pharmacological activity for the compound.
7. The method of Claim 6, wherein the monooxygenase is adult human flavin-containing monooxygenase (form 3).

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8. A method for in vitro screening of a compound for biological or pharmacological activity, comprising the steps of:

incubating a monooxygenase of claim 1 with the compound; and

detecting the amount of NADPH consumed as an indication of biological or pharmacological activity for the compound.

9. The method of Claim 8, wherein the monooxygenase is adult human flavin-containing monooxygenase (form 3).

10. A method for in vitro screening of a compound for biological or pharmacological activity, comprising the steps of:

incubating a monooxygenase of claim 1 with the compound;

and detecting the products formed from the incubation of the monooxygenase and the compound as an indication of biological or pharmacological activity for the compound.

11. The method of Claim 10, wherein the monooxygenase is adult human flavin-containing monooxygenase (form 3).

12. A method of detecting the presence, in liver tissue or a liver organ sample, of a fetal human liver flavin-containing monooxygenase (form 1) the presence of which is associated with liver cancer, comprising the steps of:

producing an antibody to the fetal human liver flavin-containing monooxygenase (form 1) of claim 1;

contacting the antibody with the tissue or the organ;

and detecting the immune complexes as an indication of the presence in the tissue or the organ sample of the fetal human liver flavin-containing monooxygenase (form 1).

13. The method of Claim 12, wherein the antibody is a monoclonal antibody.

14. A method of detecting a fetal human liver flavin-containing monooxygenase (form 1) gene associated with liver cancer, comprising the steps of:

hybridizing mRNA extracted from a liver tissue or a liver organ sample with a probe specific for the gene;
and determining the ability of the probe to hybridize to the mRNA, wherein the hybridization to the mRNA indicates the presence of liver cancer.

15. A method of detecting a fetal human liver flavin-containing monooxygenase (form 1) gene associated with liver cancer, comprising the steps of:

converting mRNA extracted from a liver tissue or a liver organ sample to cDNA;
amplifying the cDNA by PCR techniques;
hybridizing the amplified cDNA with a probe specific for the gene;
determining the ability of the probe to hybridize to the cDNA, wherein the hybridization to the cDNA indicates the presence of liver cancer.

16. A method to stereoselectively oxidize a nucleophilic compound, comprising incubating a monooxygenase with the nucleophilic compound.

17. The method of Claim 16, wherein the nucleophilic compound is selected from the group consisting of a nitrogen-containing compound, a sulfur-containing compound, and a phosphorus-containing compound.

19. A method of producing a nucleophilic compound with a center of chirality, comprising the steps of:

- incubating a monooxygenase with a substrate for the monooxygenase to produce an oxidized substrate;
- reacting the oxidized substrate with a strong base;
- reacting the resulting carbanion with an electrophilic compound; and
- separating the resulting diastereomeric compounds.

21. The method of Claim 19, wherein the electrophilic compound is an alkyl halide.

23. A method of assembling a native or active protein, comprising incubating a monooxygenase capable of selectively forming disulfides with an unfolded protein containing sulfhydryl groups.

24. The method of Claim 23, wherein the protein is a glycoprotein.

25. The method of Claim 23, wherein the monooxygenase is adult human liver flavin-containing monooxygenase (form 3).

34. The method of Claim 32, wherein the monooxygenase is adult human liver flavin-containing monooxygenase (form 3).

36. An isolated flavin-containing monooxygenase molecule of claim 1 having an amino acid sequence encoded for by a polynucleotide molecule which hybridizes under stringent conditions to an oligonucleotide probe of at least 25 contiguous nucleotides from SEQ ID NO: 6 and wherein said isolated flavin-containing monooxygenase molecule functions with flavin-containing monooxygenase form 3-like activity.

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